California's Refining Industry: A Recent History

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Introduction[1]

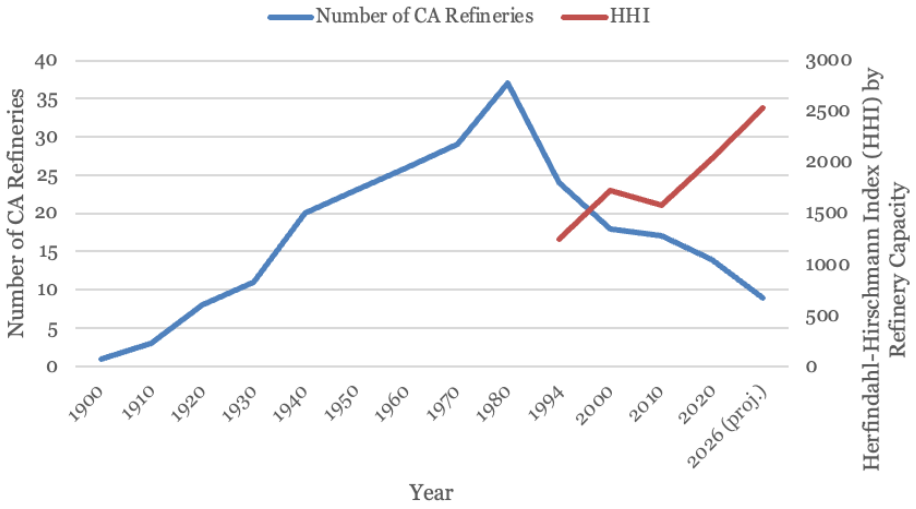
This paper examines the history of California's refining industry from 1980 to 2025, with a focus on trends in regulatory policy and market structure. California's refining sector, with a total capacity of 1.6 million bpd, is one of the largest in the United States, behind only Texas (6.3 million bpd) and Louisiana (3.0 million bpd).[2] As Figure 1 demonstrates, between 1980 and 2025, the state's industry has consolidated dramatically.[3] In 1980, California hosted 37 operating refineries, the majority (23) of them small and independent, alongside a handful of major oil firms. By 2025, only five major refiners were left in operation. We divide the 1980-2025 period into four distinct eras: 1) the ***Era of Competition (1980–1994)***, when regulatory pressures, geopolitical shocks, and thin margins forced inefficient small refiners to exit the market; 2) the ***Era of Consolidation (1994–2005)***, marked by the permissions of various potentially anti-competitive mergers; 3) the ***Era of Declining Demand (2005–2015)***, when a decline in gasoline consumption and excess refining capacity motivated the FTC to shift its assessment of California's refining industry to be more amenable to market consolidation; and 4) the ***Era of Net Importer (2015–2025)***, when refinery closures and conversions to renewable fuels facilities increased the state's reliance on marine imports of gasoline. Companies exiting refining have often cited regulatory costs and weak margins to explain their decision to exit. Simultaneously, those companies have often maintained or expanded their presence in the more profitable retail gasoline market. Recent closures or announcements of closures have sparked intense debates over energy policy in California. The paper contributes to this debate by documenting how regulatory policy, corporate consolidation, and structural supply constraints have reshaped both California's refining and, by extension, gasoline markets over the past 45 years.

[1] The author would like to thank Alyna Lu for her contributions to this work, and Daniel Karsten Posthumus, Ryan Cummings, and Neale Mahoney for their invaluable support and guidance.

[2] From now on, a refinery's capacity will refer to operating atmospheric crude oil distillation capacity in barrels per calendar day. We do not count refineries that produce strictly asphalt or naphthenic oils in our refinery count anywhere. U.S. Energy Information Administration, *"Number and Capacity of Petroleum Refineries,"* https://www.eia.gov/dnav/pet/pet_pnp_cap1_a_(na)_8D0_BpCD_a.htm.

[3] "Number of CA Refineries" refers to the number of operating California refineries for a given year in each decade, based on the California Energy Commission (CEC) Energy Almanac "California Oil Refinery History. "HHI" refers to the capacity-based HHI for California refining, computed from EIA refinery capacity data as $HHI_t=\sum_i s_{i,t}^2$, where $s_{i,t}$ is owner i's share (as a percent) of total California operable refining capacity in year t. Capacity data are from the U.S. Energy Information Administration's *Refinery Capacity Report* series, which provides refinery-level capacity files beginning in 1994; earlier years are not available in this format. The 2026 value is projected based on the latest available capacity information rather than an observed year in the historical series. See: California Energy Commission (CEC), Energy Almanac, "California Oil Refinery History," https://www.energy.ca.gov/data-reports/energy-almanac/californias-petroleum-market/californias-oil-refineries/california-oil; U.S. Energy Information Administration, "Refinery Capacity Report," https://www.eia.gov/petroleum/refinerycapacity/(accessed February 27, 2026).

Figure 1. California Refining: Number of Refineries and Capacity-Based HHI, 1900–2026



1980-1994: Era of Competition

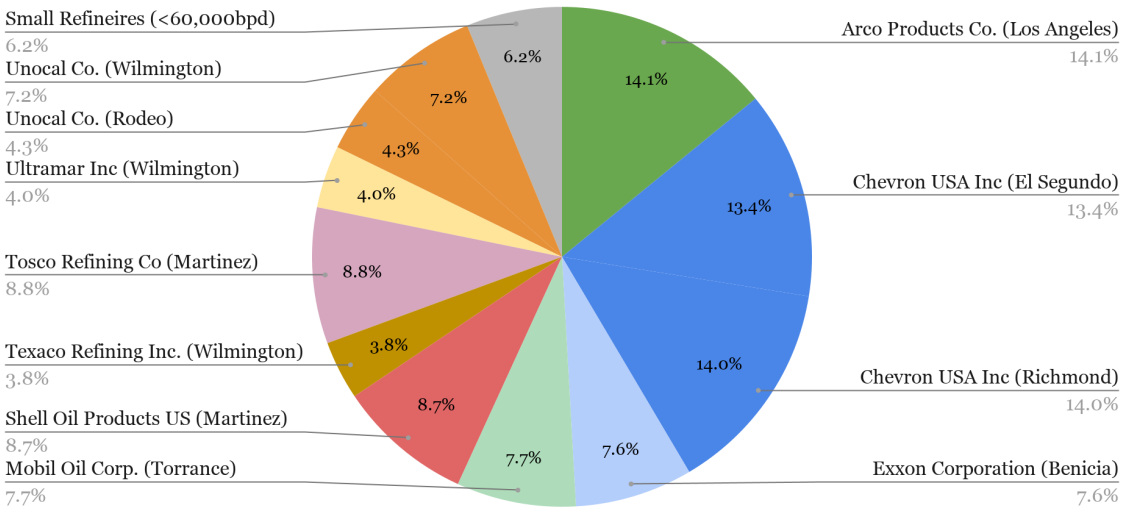
California's refining industry could be divided into two segments between 1980 and 1994: a handful of well-established oil majors and otherwise small or independent refiners. Over this period, we argue that environmental regulations, geopolitical shocks, and possible exercises of market power by larger firms pushed many of the less efficient and more heavily polluting small refineries to exit the refining market.

Figure 2 displays refinery share of capacity in California in 1994, the first year that EIA began reporting aggregated data on refinery-level share of capacity.[4] We combine "small refineries" (<60,000 bpd) in the grey portion of the chart. Refineries owned by the same company have the same color (e.g., both Chevron refineries are in blue).

[4] Refinery capacity data comes from historical refinery capacity reports on EIA website, beginning in 1994. EIA, unfortunately, does not publish aggregated data before 1994. See: U.S. Energy Information Administration, "Refinery Capacity Report," annual data on operable petroleum refinery capacity and related tables (as of January 1, 2025), accessed February 27, 2026, https://www.eia.gov/petroleum/refinerycapacity/.

Figure 2. Refinery Share of Capacity 1994

Operating Atmospheric Crude Oil Distillation, Barrels per Calendar Day



A Handful of Oil Majors

In this section we briefly provide the historical background of these oil majors, which have been dominant players in the state's market since well before 1994.

1. **Chevron:** Chevron's two refineries, in El Segundo (Southern California) and Richmond (Northern California) make up over one quarter of total refining capacity in 1994. In the 19th century, Chevron was originally the California branch of Standard Oil Company, a corporate trust that had horizontally integrated 90 percent of the U.S. oil refining industry.[5] Standard Oil Company's subsidiary, Pacific Coast Oil, first entered the California refining market after opening its Richmond refinery in 1902.[6]

   In 1911, the Standard Oil trust was broken up in the Supreme Court case *Standard Oil Co. of New Jersey v. United States,* in which the Court determined that Standard Oil had illegally monopolized the U.S. petroleum industry.[7] Standard Oil broke up into 39 subsidiaries and Standard Oil Company of California became the independent proprietor of the Richmond refinery.[8]

[5] "Standard Oil – A Company So Effective, Only the U.S. Government Could Compete with it," *Technology and Operations Management MBA Student Perspectives* (HBS Digital Initiative), posted December 2, 2015, accessed March 5, 2026, https://d3.harvard.edu/platform-rctom/submission/standard-oil-a-company-so-effective-only-the-u-s-government-could-compete-with-it/.

[6] California Energy Commission (CEC), Energy Almanac, "California Oil Refinery History," https://www.energy.ca.gov/data-reports/energy-almanac/californias-petroleum-market/californias-oil-refineries/california-oil

[7] Standard Oil Co. of New Jersey v. United States, 221 U.S. 1 (1911).

[8] Many other successor entities end up playing a role in California. For example, Standard Oil Company of New Jersey became Exxon Company and Standard Oil of Ohio merged with Standard Oil of Indiana to become BP in 1998, both of whom later own refineries in the state.

Following the 1911 breakup, Standard Oil Company of California (SoCal) opened its El Segundo refinery in 1912, which produced 226,000 barrels per day in 1994. Since 1931, a chevron design had appeared on the labels of some SoCal products, a branding device increasingly tied to the company's identity. As such, in 1984, SoCal officially renamed itself to Chevron Corporation following its merger with Gulf Oil Corporation.[9]

2. **Unocal***:* Union Oil of California was the first refiner in the state, opening its Rodeo refinery in Northern California in 1896.[10] Twenty years later, Union Oil of California expanded to Southern California, opening its Wilmington refinery in 1917.

3. **ARCO***:* Richfield Oil Company opened its Los Angeles (Carson) refinery in 1938.[11] Richfield merged with Atlantic Refining in 1966, creating Atlantic Richfield Company (ARCO). ARCO's refinery in Carson was the largest in the state in 1994, producing 237,000 bpd.[12]

A (Decreasingly) Pluralistic Market

Unlike today's market, the market in 1980 was relatively pluralistic, with many smaller refineries operating independently alongside these oil majors. In 1980, California had 37 operating refineries, with 23 producing less than 60,000 barrels per calendar day (bpd) of operating atmospheric crude oil—our definition of a small refinery. For reference, the smallest oil refinery owned by a major company in California today (Valero's Wilmington refinery) produces 85,000, and only one independent refinery currently produces less than 60,000 bpd.[13] By 1994, the number of operating refineries in California had plummeted from 37 to 20: 17 refineries closed in the 80s and early 90s, 15 of which were small and/or independently owned.

Many refiners that closed during this period publicly blamed California's stringent regulatory environment for their market exit. We argue that this narrative is over-simplistic and reductionist. We identify three broad forces behind refinery closures: the first two pertain primarily to small and independent refineries, while the third mostly applied to certain closures by major oil firms.

Environmental regulation likely placed disproportionate pressure on smaller refineries, which tended to be less efficient and more polluting. That pressure may have been compounded by a volatile geopolitical environment, exposing refiners to sharp price swings and margin pressure.

In a limited number of cases involving major oil firms, closures may also have resulted from the possible exercise of market power through the shutdown of their smallest facilities.

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[9] Pacific Coast Architecture Database, 'El Segundo Refinery (El Segundo, CA),' University of Washington Libraries, last modified 2021, https://pcad.lib.washington.edu/building/1142/.
[10] California Energy Commission (CEC), Energy Almanac, "California Oil Refinery History," https://www.energy.ca.gov/data-reports/energy-almanac/californias-petroleum-market/californias-oil-refineries/california-oil
[11] California Energy Commission (CEC), Energy Almanac, "California Oil Refinery History," https://www.energy.ca.gov/data-reports/energy-almanac/californias-petroleum-market/californias-oil-refineries/california-oil
[12] U.S. Energy Information Administration, "Refinery Capacity Report," https://www.eia.gov/petroleum/refinerycapacity/(accessed February 27, 2026).
[13] Kern Oil & Refining Company's Bakersfield Refinery.

1. **Environmental Regulations**: Anti-pollution measures in the 1980s and 1990s increased regulatory burdens on refiners, particularly small refiners. The Los Angeles South Coast Air Basin has historically been (and is still today) the most polluted air basin in the US.[14] Under the regulatory framework established by the 1970 Clean Air Act, and expanded through the 1977 and 1990 amendments, federal and state regulators imposed increasingly stringent air-quality requirements on areas that failed to meet national standards.[15]

   Achieving these new stringent environmental standards was especially difficult for small, independent refineries. Compliance often required fixed capital and operating expenditures that were harder for smaller plants to absorb, given their more limited scale and financial resources. As an illustrative example, Pauley Petroleum's Newhall Refinery, a roughly 23,000 bpd plant, received 12 South Coast Air Quality Management District violations between April and August 1986.[16]

   California also implemented its reformulated gasoline program (CaRFG) in 1991, setting stringent standards for California gasoline.[17] CaRFG imposed chemical restrictions on gasoline, limiting components associated with smog-forming and toxic emissions, including sulfur, benzene, and high-vapor-pressure compounds. The program was intended to reduce vehicle emissions and help California attain federal air-quality standards. The program was implemented in three phases, with plans for Phase 1 and Phase 2 being adopted in November 1991, and implemented by January 1992 and March 1996, respectively.[18] As California refineries had to adjust their products to meet these standards by 1996, the policy affected refineries' long-term prospects and pushed many to close. Again, complying with stricter gasoline standards likely required refinery modifications that were harder for less efficient and well-capitalized plants to make.[19]

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[14] South Coast Air Quality Management District (SCAQMD), "About SCAQMD," https://www.aqmd.gov/aq-spec/aboutscaqmd.

[15] The Clean Air Act established the National Ambient Air Quality Standards (NAAQS) and required states to develop State Implementation Plans (SIPs) to achieve those standards. The 1977 amendments added major permitting and permit-review requirements, while the 1990 amendments expanded federal authority through a stationary-source operating permits program and an expanded air-toxics program. U.S. Environmental Protection Agency, "Summary of the Clean Air Act," https://www.epa.gov/laws-regulations/summary-clean-air-act; U.S. Environmental Protection Agency, "Evolution of the Clean Air Act," https://www.epa.gov/clean-air-act-overview/evolution-clean-air-act.

[16] Myron Levin, "Newhall Refining Draws Its 12th Citation," *Los Angeles Times*, August 29, 1986, https://www.latimes.com/archives/la-xpm-1986-08-29-me-14693-story.html.

[17] California Air Resources Board (CARB), "California Reformulated Gasoline Regulations" (PDF), https://ww2.arb.ca.gov/sites/default/files/2020-05/California_Reformulated_Gasoline_Regulations_2-16-14.pdf.

[18] Phase 1, (CaFRG1) which eliminated lead and regulated reid vapor pressure (RVP), brought California into line with national lead phase-outs. Phase 2 was *much more* stringent. See: California Air Resources Board, "California Reformulated Gasoline," https://ww2.arb.ca.gov/our-work/programs/fuels-enforcment-program/california-reformulated-gasoline.

[19] California Coastal Commission, Staff Recommendation, Application No. E-95-20, Ultramar, Inc., Step 3 Reformulated Fuels Program (January 26, 1996), stating that compliance with EPA and CARB reformulated-fuels requirements required the refinery to be reconfigured and that the Step 3 project included "additional units for the production of reformulated gasoline." https://documents.coastal.ca.gov/reports/1996/2/W10b-2-1996.pdf

While gasoline taxes increased substantially during this period (by roughly 103 percent in real terms), they were unlikely to have disproportionately affected smaller firms, since the tax applied to all refiners.[20] Moreover, state gasoline taxes are generally passed through almost entirely to consumers through higher retail prices.[21]

2. **Geopolitical Environment***:* Wars in the Middle East generated substantial uncertainty over oil prices, and the resulting volatility may have been particularly difficult for smaller refiners to absorb. Both the Iran–Iraq War beginning in 1980 and the Persian Gulf War from August 1990 to February 1991 disrupted global oil markets and contributed to sharp swings in crude and refined-product prices.[22]

   The Persian Gulf War in particular shows how wartime price expectations could reverse in ways that limited refiners' ability to benefit from higher prices. On the night the war began, many oil companies froze gasoline prices to avoid abrupt increases that might have triggered panic buying and hoarding.[23] Yet in January 1991, one day after the United States launched Operation Desert Storm, NYMEX crude oil prices fell 33 percent, from 76.2 to 51.2 cents per gallon. Gasoline and heating-oil futures also dropped sharply: unleaded gasoline futures fell 26 percent, from 82.2 to 61.2 cents per gallon, while heating-oil futures fell 32 percent, from 91.6 to 61.9 cents per gallon. In other words, the rapid resolution of supply uncertainty caused by the Operation, as well as the strategic release of oil from strategic petroleum reserves, caused refined-product futures to decline at least as much as crude.[24] Oil prices remained low

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[20] Combined federal and state taxes increased 26.51 cpg between 1980 and 1994, a 265 percent nominal increase. For historical state motor-fuel tax rates, see *State Motor-Fuel Tax Rates, 1981–1995*, Table MF-205 (April 1997), Federal Highway Administration, https://www.fhwa.dot.gov/ohim/summary95/mf205.pdf (accessed August 25, 2025). It is important to note that California's state tax remained below the national average in 1994; while California had nearly caught up to Washington—which raised its gas tax from 12 cpg to 23 cpg over the same period—California's starting point was considerably lower. See Washington State Department of Revenue, https://dor.wa.gov/sites/default/files/2022-03/Chart5.pdf. Inflation adjustment uses the CPI for All Urban Consumers (CPI-U), series CPIAUCSL (FRED): annual average CPI-U was 82.383 in 1980 and 148.225 in 1994, implying an inflation factor of 1.799. Federal Reserve Bank of St. Louis, FRED, "Consumer Price Index for All Urban Consumers: All Items in U.S. City Average (CPIAUCSL)," https://fred.stlouisfed.org/series/CPIAUCSL (accessed March 5, 2026).

[21] Hayley Chouinard and Jeffrey M. Perloff, "Incidence of Federal and State Gasoline Taxes," Economics Letters 83, no. 1 (2004): 55–60. The authors estimate that state gasoline taxes fall primarily on consumers and that a one-cent increase in the average state gasoline tax raises the retail gasoline price by approximately one cent.

[22]Robert J. McCartney, "Markets Take Worst Hit Yet on Gulf Uncertainty: Oil Prices Soar $3 a Barrel; Dow, Nikkei Fall," Washington Post, August 6, 1990, https://www.washingtonpost.com/archive/business/1990/08/07/markets-take-worst-hit-yet-on-gulf-uncertainty/03d0d695-7e51-4841-ac03-ed291e2fbf78/; Richard M. Weintraub and John M. Berry, "Persian Gulf War Is Causing Strain On Price For Oil: Prolonged War Between Iraq and Iran Causes Strain on Oil Prices," Washington Post, November 21, 1980, https://www.washingtonpost.com/archive/politics/1980/11/22/persian-gulf-war-is-causing-strain-on-price-for-oil/ad7008aa-2799-4451-b470-aacb9d9d11aa/.

[23] Patrick Lee, "Impact of the Gulf War: Crude Plunges; Gasoline Prices to Dealers Cut," *Los Angeles Times*, January 18, 1991. https://www.latimes.com/archives/la-xpm-1991-01-18-fi-102-story.html.

[24] Rick Newman, "Lessons from the Last War that Rocked Global Markets," Yahoo Finance, February 25, 2022, https://finance.yahoo.com/news/lessons-from-iraq-kuwait-invasion-225924707.html. On the SPR release: the U.S. released 17.3 million barrels of crude oil from the Strategic Petroleum Reserve as part of a coordinated IEA collective action on the day Desert Storm launched. U.S. Energy Information Administration, "New Legislation Affects U.S. Strategic Petroleum Reserve," January 16, 2014, https://www.eia.gov/todayinenergy/detail.php?id=24072.

in the months that followed, partly because of a mild recession that had begun before the invasion in July 1990, which prompted the Federal Reserve to cut short-term interest rates six times before Desert Storm launched.[25]

Smaller refiners may have been especially vulnerable to these wartime reversals because they were squeezed by *both* high crude input costs and falling wholesale gasoline prices. Some refiners without crude production of their own may have taken long positions in crude futures in anticipation of wartime shortages, only to face trading losses when prices fell. Unlike major integrated oil companies, many smaller refiners lacked upstream crude production and were therefore more directly exposed to fluctuations in refining margins. As a result, sharp reversals in crude and gasoline prices may have had a disproportionate impact on their profitability.

3. **Possible Exercise of Market Power**: Not all refinery closures during this period involved small independent firms. Shell's closure of its smaller Carson refinery and Chevron's closure of its smaller Bakersfield refinery may have been strategic exercises of market power by the oil majors. As UC Berkeley Professor Severin Borenstein said in reference to the sale of Shell's Bakersfield refinery in 2005, "It would be very surprising if Shell in evaluating the closure did not consider the impact it would have on the overall profitability of the firm, which necessarily includes the effect on the profitability of its other refineries."[26] In general, if taking a refinery offline has a positive impact on price, then that price increase is factored into a large corporation's decision on whether or not to close. In this way, market power from large firms may have motivated refinery closures during the period.

   While this reasoning is applied here to only Chevron Bakersfield and Shell Carson, two small refineries owned by oil majors, it points to a more complex story belying the period's refinery closures. Shell Carson, for example, cited economic and regulatory pressures despite remaining profitable overall; this would be consistent with the closure reflecting refinery *owner*-level profit considerations rather than only the single refinery's economics.[27]

Closures of Small and Independent Refineries

As a result of the factors discussed above, numerous refinery closures were announced during this period. We briefly describe several of them and the stated reasons for closure here.

[25] The recession itself had multiple causes, including pessimistic consumers, debt accumulation during the 1980s, a credit crunch induced by overzealous banking regulators, and the Federal Reserve's prior rate hikes to combat inflation. Carl E. Walsh, "What Caused the 1990–1991 Recession?," FRBSF Economic Review 1993, no. 2 (1993): 34–48, Federal Reserve Bank of San Francisco, https://www.frbsf.org/wp-content/uploads/93-2_34-48.pdf.
[26] Severin Borenstein, James Bushnell, and Matthew Lewis, *Market Power in California's Gasoline Market*, CSEM Working Paper 132 (Berkeley: University of California Energy Institute, May 2004), accessed August 25, 2025.
[27] Patrick Lee, "Shell Oil Will Sell L.A.-Area Refinery or Shut It Down," *Los Angeles Times*, June 22, 1991, https://www.latimes.com/archives/la-xpm-1991-06-22-fi-866-story.html.

- Chevron's 26,000 bpd Bakersfield refinery announced its closure in 1986, citing uneconomic operations.[28] Reporting also pointed to reduced availability of the light crude it was designed to process, a concern plausibly linked to Iran–Iraq War disruptions.[29]
- In 1987, Ultramar closed its Hanford refinery, which was producing at a loss. Ultramar would acquire a Wilmington refinery the next year.[30]
- Pauley Petroleum's Newhall refinery, whose struggles to comply with environmental regulations we briefly mentioned above, announced that it would close down in October 1989. According to an *LA Times* article, "upgrades required by environmental laws would be too costly given the market for the plant's asphalt, jet fuel and fuel oil".[31]
- Fletcher Oil & Refining Company also announced the closure of their Carson refinery, producing 30,000 bpd, in November 1991. Fletcher President James Lopeman stated the company had been unable to turn a profit because of a dramatic drop in petroleum prices in Los Angeles, where much of its crude oil was sold.[32]
- Golden West also cited decreased profit margins as one of the reasons behind the conversion of their Santa Fe Springs refinery, producing 47,000 bpd, into a storage terminal in 1992: "We're shutting down because [profit] margins are inadequate," noted senior vice president John Kemple, mentioning Persian War price volatility as a contributing factor.[33]
- Also in 1992, Shell closed its Carson refinery, the largest refinery to close during the period (120,000 bpd). The company cited economic and regulatory pressures; however, as discussed above, the closure may also have reflected broader refinery owner-level incentives. Today, the site operates as a terminal facility.
- Additionally, the following small refineries closed during this period:
    - *November 1984*: Golden Eagle's Carson refinery (16,000 bpd).[34]
    - *July 1987*: Gibson Oil's Bakersfield refinery (9,600 bpd).
    - *1995*: Pacific Company's Hercules refinery (50,000 bpd).[35]

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[28] "Chevron said it will close its Bakersfield refinery," *Los Angeles Times*, January 11, 1986.

[29] U.S. Energy Information Administration, "Iraq," country analysis note, noting that Iraq's main export crude streams include Basra Light and Kirkuk. Available at: https://www.eia.gov/international/analysis/country/IRQ/background.

[30] "Ultramar PLC," *Encyclopedia.com*, accessed August 25, 2025. Encyclopedia entry detailing Ultramar's role as a U.K. holding company in oil and gas exploration, shipping, refining, and marketing; its incorporation in 1935 as Ultramar Exploration Co. Ltd.; 1989 employment of 3,792; sales of £1.76 billion (US $3.40 billion); and listing on the London, Montreal, and Toronto stock exchanges.

[31] Larry B. Stammer, "Pauley Closing Its Newhall Refinery," *Los Angeles Times*, October 17, 1989.

[32] Anthony Millican, "Oil Refinery to Close; Up to 200 Face Layoffs: Carson: Fletcher Oil blames the economy for the temporary shutdown," *Los Angeles Times*, November 15, 1991, accessed August 25, 2025.

[33] Rick Holguin and Gerald Faris, "Shutting Down: Golden West Refinery Closure Will Cost 280 Their Jobs," *Los Angeles Times*, December 22, 1991, accessed August 25, 2025.

[34] California Energy Commission (CEC), Energy Almanac, "California Oil Refinery History," https://www.energy.ca.gov/data-reports/energy-almanac/californias-petroleum-market/californias-oil-refineries/california-oil

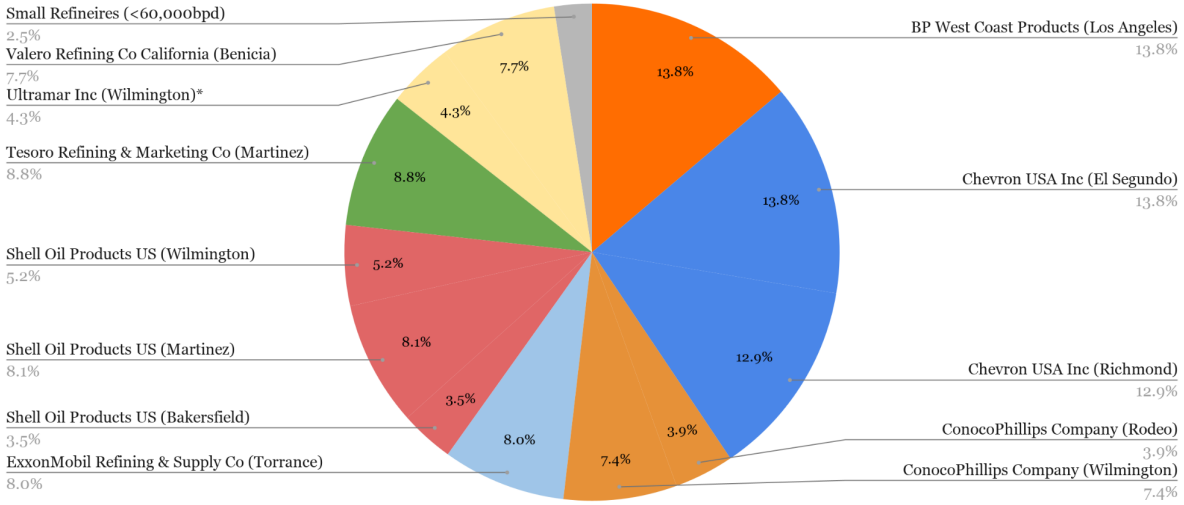
[35] While first announcing in 1993 that it would shut down due to heavy losses and clean-fuel costs, the company reversed course after new asphalt sales kept it afloat, before finally closing for good in 1995. Erin Hallissy, "Refinery Will Quit Hercules Production / 142 Workers Have Been Given Pink Slips," *SFGate*, June 8, 1995.)

1994-2005: Era Of Consolidation

The decade from 1994 to 2005 was characterized by mergers among major oil corporations operating in California. As Figure 3 shows, companies such as Shell, Valero, and ConocoPhillips (presently Phillips 66) captured large portions of the market during this decade, resulting in a more consolidated market than the one illustrated in Figure 2 (1994).

Figure 3. Refinery Share of Capacity 2005[36]

Operating Atmospheric Crude Oil Distillation, Barrels per Calendar Day



We propose here one plausible policy channel through which mergers may have become easier during this era. Merger review appears to have been relatively less stringent under the Bush administration, with a lower share of filings receiving "Second Requests" than during the first term of the Obama administration at both the FTC and DOJ.[37]

Additionally, antitrust analysis often (falsely; see Figure 4) treated Northern and Southern California as distinct refining markets. Separating the Northern and Southern markets narrowed their respective sizes. This generally makes mergers appear more problematic, but narrower markets also meant less overlap between merging parties. A merger combining two refineries in the *same* region faced amplified scrutiny under separate markets, while a merger combining two refineries in *different* regions faced quelled scrutiny. Scrutiny was not systematically higher or lower than it would have been under a single statewide market; it was altered by a market definition that did not hold up against actual price behavior.

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[36] *Ultramar owned by Valero

[37] *Mergers, Market Power, and the Need for More Vigorous Enforcement*, AntitrustInstitute.org (Preview of Am. Antitrust Inst. Merger Chapter of 2016 Presidential Transition Rep., posted Mar. 25, 2016), https://www.antitrustinstitute.org/wp-content/uploads/2018/08/mergerfinal.pdf.

The Texaco-Shell Joint Venture

In 1996, Texaco, Shell, and Aramco announced a major combination of U.S. refining and retail operations to potentially unite control of 23 percent of California's gasoline market.[38] The deal was notable because it would, for the first time, place three California refineries under a single owner: Shell's Martinez refinery together with Texaco's Wilmington and Bakersfield refineries.[39]

With this transaction, there was a mismatch between federal and regional concerns. Most contemporaneous commentary was not concerned with the transaction having anticompetitive effects nationally, while such concerns *were* prominently raised at the regional level, particularly in California.[40] As established above, treating regions as separate markets meant a firm could hold one refinery in Northern California and one in Southern California without the FTC treating them as overlapping. The Texaco-Shell venture, however, combined two refineries in the north, Martinez and Bakersfield, an overlap amplified by the shrunken market. Taken together, these two refineries accounted for 16 percent of statewide capacity.

Despite this, federal antitrust review did not block the transaction outright, allowing the deal to proceed conditional on divestitures and supply commitments.[41] The deal was formally signed in March 1997, and by January 1998 the companies began jointly operating under the name "Equilon."[42]

Shell gained exclusive ownership of these three refineries in September 2001, when the FTC approved the Chevron–Texaco merger on the condition that Texaco divest its shares in Equilon.[43]

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[38] Chris Kraul, "Texaco, Shell, Aramco May Combine Units," *Los Angeles Times*, October 8, 1996, https://www.latimes.com/archives/la-xpm-1996-10-08-fi-51542-story.html.

[39] When Texaco acquired Getty Oil's Bakersfield refinery in 1984 (its second California refinery, having purchased the Wilmington refinery from CalPet in 1928) the Federal Trade Commission made the acquisition conditional on several requirements: Texaco had to sell California crude to certain Getty customers and other eligible West Coast refiners for five years, and was subject to additional access and acquisition restrictions. The acquisition was completed July 10, 1984. See Federal Trade Commission, *In the Matter of Texaco Inc. and Getty Oil Company*, Complaint and Decision, Docket 3132 (July 10, 1984), in *Federal Trade Commission Decisions*, vol. 104 (July–December 1984), 241–279, https://www.ftc.gov/sites/default/files/documents/commission_decision_volumes/volume-104/ftc_volume_decision_104__july_-_december_1984pages_241-_279.pdf.

[40] National refining and retail shares were below the rough 30 percent cited by former FTC attorney Garrett Rasmussen as typically drawing FTC alarm. See: Chris Kraul, "Texaco, Shell, Aramco May Combine Units," *Los Angeles Times*, October 8, 1996, https://www.latimes.com/archives/la-xpm-1996-10-08-fi-51542-story.html.

[41] The required remedies included divestiture of Shell's Anacortes, Washington refinery assets; a retail package in San Diego; certain Oahu distribution assets; and either Texaco's interest in Colonial or Shell's interest in Plantation pipeline assets in the Deep South. The FTC also required replacement supply commitments for branded sellers that had relied on Anacortes. See: Federal Trade Commission, "Shell Oil Company, Texaco Inc. and Star Enterprise (971 0026)," case page, accessed February 25, 2026, https://www.ftc.gov/legal-library/browse/cases-proceedings/971-0026-shell-oil-company-texaco-inc.

[42] *Los Angeles Times*, "Texaco, Shell Sign Deal Creating New Firm," March 19, 1997, https://www.latimes.com/archives/la-xpm-1997-03-19-fi-39801-story.html; Chevron Corporation (investor-relations archive static file), accessed February 25, 2026, https://chevroncorp.gcs-web.com/static-files/655922cc-5f47-48b9-b0c1-5f535428da86.

[43] Federal Trade Commission, "FTC Consent Agreement Allows the Merger of Chevron Corp. and Texaco Inc., Preserves Market Competition," press release, September 7, 2001, https://www.ftc.gov/news-events/news/press-releases/2001/09/ftc-consent-agreement-allows-merger-chevron-corp-texaco-inc-preserves-market-competition.

Concerning Shell's stake, FTC commissioners "evaluated the formation of the Alliance as if it were a complete merger of the downstream operations of Texaco and Shell."[44] Therefore divestitures, as this decision demonstrates, did not necessarily create new independent competitors. Instead, refining assets often remained in the hands of existing oil majors, making consolidation partly a redistribution among large incumbent firms.

The Exxon/Mobil Merger

In December 1998, Exxon agreed to buy Mobil for $73.7 billion, creating what was, at the time, the largest corporation in the world.[45] Together, Exxon and Mobil would account for 13.5 percent of U.S. gasoline sales in 1997, and four percent of global oil production capacity. The FTC alleged the acquisition would significantly weaken competition in gasoline refining and marketing in the United States, allowing the newly-created ExxonMobil to raise gasoline prices and consequently harm consumers.

After an extensive investigation, the FTC accepted a proposed consent order in November 1999 that allowed the merger to proceed with major restructuring.[46] The order required the largest retail divestiture in FTC history—about 2,431 Exxon and Mobil retail outlets across the U.S. (and 360 in California)—and the sale of Exxon's Benicia refinery in California along with the associated terminal and pipeline assets. Exxon was given up to a year to sell the 129,500 bpd refinery at Benicia and was required to guarantee the provision of 100,000 bpd of crude to the refinery's new owner for the subsequent 10 years.[47]

California Attorney General Bill Lockyer said the state would oppose the sale of the refinery to any of California's other major refiners, with the goal of "restoring competition to the California gasoline marketplace."[48] Exxon's Benicia refinery ended up being sold to Valero, the latter's entry into the California refining industry, which we will explore further below.[49]

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[44] Federal Trade Commission, "Chevron Corporation/Texaco Inc. — Statement of Commissioners Anthony and Thompson" (File No. 011-0011, Docket No. C-4023), accessed February 25, 2026, https://www.ftc.gov/sites/default/files/documents/cases/2002/01/ftc.gov-chevronstate.htm; Integration incited complaints at the retail level. In *Texaco, Inc. v. Dagher*, 547 U.S. 1 (2006), service station owners argued that Equilon's unified pricing amounted to unlawful price-fixing under § 1 of the Sherman Act. Justice Thomas, writing for the unanimous court, held that a lawful, fully integrated joint venture may set a single price for its own products without triggering *per se* liability. In effect, the Court treated Shell and Texaco as investors in a single venture rather than competitors fixing prices against each other. See: Oyez, "*Texaco, Inc. v. Dagher*," Supreme Court of the United States, No. 04-805 (accessed February 26, 2026). https://www.oyez.org/cases/2005/04-805

[45] Cape Cod Times, "Exxon buys Mobil for $73.7…" (Dec. 12, 1998). https://www.capecodtimes.com/story/news/1998/12/12/exxon-buys-mobil-for-73/51042958007/

[46] 3 Federal Trade Commission, "Exxon/Mobil Agree to Largest FTC Divestiture Ever in Order to Settle FTC Antitrust Charges; Settlement Requires Extensive Restructuring and Prevents Merger of Significant Competing U.S. Assets" (Nov. 30, 1999). https://www.ftc.gov/news-events/news/press-releases/1999/11/exxonmobil-agree-largest-ftc-divestiture-ever-order-settle-ftc-antitrust-charges-settlement-requires

[47] Oil & Gas Journal, "FTC finally clears Exxon-Mobil merger" (Dec. 6, 1999). https://www.ogj.com/general-interest/companies/article/17229853/ftc-finally-clears-exxon-mobil-merger

[48] California Department of Justice, Office of the Attorney General, "Attorney General Lockyer Announces California Agreement in Exxon-Mobil Antitrust Case; Requires Divestment of Benicia Refinery, 368 Stations" (Nov. 30, 1999). https://oag.ca.gov/news/press-releases/attorney-general-lockyer-announces-california-agreement-exxon-mobil-antitrust

[49] Federal Trade Commission, "Exxon–Valero Letter," letter from Donald S. Clark (Secretary) to Charles F. Rule (Covington & Burling), May 12, 2000, re: *Exxon Corporation and Mobil Corporation*, File No. 991-0077; FTC

Valero's Acquisition of Ultramar

After entering the California refining market through its acquisition of Exxon's Benicia refinery, Valero moved to acquire Ultramar Diamond Shamrock, a significant competitor in the state. In its complaint and consent order, the FTC concluded that, because both Valero and Ultramar were leading refiners and marketers in California, the merger could weaken competition in Northern California's refining sector.[50] In February 2002, the roughly $6 billion merger was approved subject to conditions imposed by the FTC: Valero had to divest Ultramar's Golden Eagle refinery in Martinez, along with bulk gasoline supply contracts and retail service stations.[51] In May 2002, Tesoro acquired the Golden Eagle refinery.[52]

Valero was permitted, however, to retain Ultramar's Wilmington refinery, despite already owning Benicia. Critically, the FTC's competitive analysis treated Northern and Southern California as effectively distinct markets. The FTC's analysis of the Northern California market itself applied a version of the hypothetical monopolist test. In its *Analysis to Aid Public Comment* (Dec. 27, 2001), the FTC argued that "North Coast" refiners (the relevant geographic market for CARB gasoline in Northern California) could raise prices without losing significant sales to outside suppliers.[53] With reference to Wilmington, the FTC separately argued that refineries in the Los Angeles area were unlikely to constrain Northern California pricing, because shipping supply north would be too costly.

Docket No. C-3907 (approving Exxon Mobil's proposed divestiture of its California refining and marketing assets to Valero Refining Company-California, a wholly owned subsidiary of Valero Energy Corporation), https://www.ftc.gov/system/files/documents/cases/exxon-valero_letter.pdf.

[50] According to the Commission, even a one-cent per gallon increase in CARB gasoline prices could potentially cost California consumers more than $150 million annually

[51] Federal Trade Commission, *Valero Energy Corporation and Ultramar Diamond Shamrock Corporation* (Case No. 0110141) case summary and timeline, accessed May 14, 2002, https://www.ftc.gov/legal-library/browse/cases-proceedings/0110141-valero-energy-corporation-ultramar-diamond-shamrock-corporation; "Valero Agrees to Divest Some Assets In Effort to Clear Regulatory Hurdles," *The Wall Street Journal* (Dec. 4, 2001), accessible via WSJ subscription, https://www.wsj.com/articles/SB100741673780263320.

[52] Tesoro to buy Valero's Golden Eagle refinery in California for about $1.075 billion, *Oil & Gas Journal*, Feb. 5, 2002, https://www.ogj.com/refining-processing/article/17249032/tesoro-to-buy-valeros-golden-eagle-refinery-in-california-for-1-billion.

[53] Federal Trade Commission, *Valero Energy Corporation – Analysis of Proposed Consent Order to Aid Public Comment*, Dec. 18, 2001, https://www.ftc.gov/sites/default/files/documents/cases/valero_energy_corporation_-_analysis.html.

Figure 4. Northern and Southern California CARBOB Spot Price Spread, 2008–2026[54]

This assumption appears inconsistent with subsequent market behavior. As Figure 4 shows, the spread between Northern and Southern California CARBOB spot prices remained close to zero for most of the period from 2008 to 2020, suggesting that gasoline moved freely between the two regions through barges, product swaps, and other mechanisms. Price differences, when they emerged at all, were quickly arbitraged away by market participants.[55]

The Philips/Tosco Merger

In February 2001, Phillips Petroleum reached an agreement to buy Tosco Corporation, a $7 billion deal that allowed Phillips to gain control over Tosco's Wilmington and Rodeo refineries.[56] The investigation closed in September with the FTC allowing the merger without divestitures.[57] They concluded that the deal was unlikely to harm competition because the firms largely operated in different geographic markets.[58] Again, we can see the FTC use its classification of Northern and Southern California as separate markets to justify allowing market consolidation.

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[54] Figure reports the difference between Northern California and Southern California CARBOB spot prices (NorCal minus SoCal), expressed in dollars per gallon. Data are from the California Energy Commission (CEC). Positive values indicate higher spot prices in Northern California, while negative values indicate higher spot prices in Southern California.

[55] After 2020, refinery outages, supply disruptions, and heightened market volatility generated larger temporary divergences between Northern and Southern California prices. Despite these episodes, the average spread after 2020 remained below two cents per gallon.

[56] *The New York Times* (Feb. 5, 2001), "Phillips Petroleum to Acquire Refiner in $7 Billion Deal," https://www.nytimes.com/2001/02/05/us/phillips-petroleum-to-acquire-refiner-in-7-billion-deal.html.

[57] Federal Trade Commission (Sept. 17, 2001), "FTC Closes Phillips-Tosco Investigation," https://www.ftc.gov/news-events/news/press-releases/2001/09/ftc-closes-phillips-tosco-investigation.

[58] Nationally their combined refining or gasoline marketing sales would not exceed 10 percent, and in the few metro areas where their gasoline marketing overlapped, their combined market shares were relatively low. It also stressed that, unlike prior oil mergers, this transaction did not consolidate Alaska North Slope reserves/production, and Phillips' acquisition of Tosco's West Coast refineries was unlikely to significantly affect Phillips' Alaska North Slope crude supply to other West Coast refiners or those refiners' output.

Other Market Movements

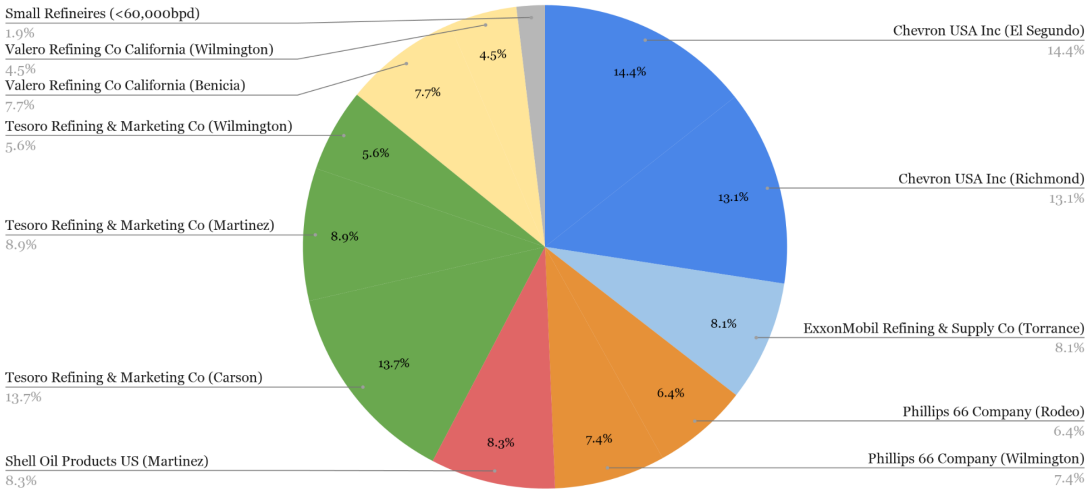
On April 13, 2000, the FTC accepted a proposed consent order clearing BP Amoco's $26.8 billion acquisition of ARCO.[59] The deal brought ARCO's Carson refinery, the joint-largest in California at 260,000 bpd, under BP's control. The acquisition, however, did not combine the California refining assets of two existing competitors, as BP had no refinery operations in the state prior to the merger. Consistent with this, the FTC's principal antitrust concerns centered on crude-oil production and transportation markets outside California rather than on the state's refining sector.[60]

2005-2015: Era of Declining Demand

By 2015, California's refining industry had reached a stage of tremendous consolidation. As displayed in Figure 5, eleven refineries owned by six large corporations accounted for 98.2 percent of state capacity. In 1994, by comparison, the six largest refinery owners accounted for only 78.2 percent of state refining capacity.

Figure 5. Refinery Share of Capacity 2015

Operating Atmospheric Crude Oil Distillation, Barrels per Calendar Day



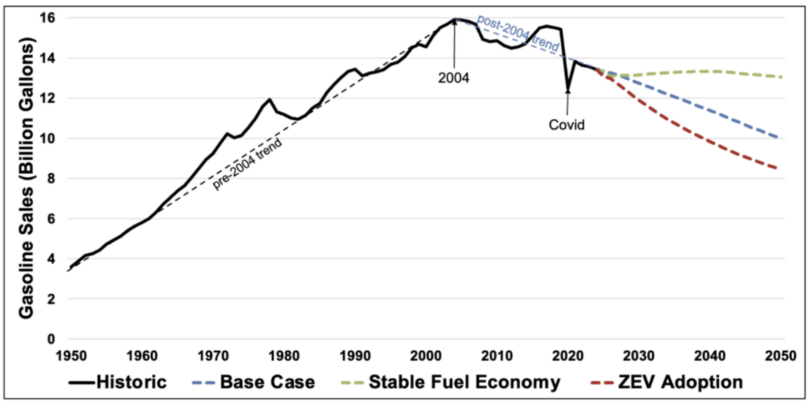
California's oil and gas industry during the decade from 2005 to 2015 can broadly be characterized primarily by two phenomena: 1) decreasing demand and 2) peaking total refinery capacity. First, after peaking in 2004, retail gasoline sales have decreased steadily—as illustrated in Figure 6

[59] CBS News, "BP Amoco Acquires Arco" (April 1, 1999), https://www.cbsnews.com/news/bp-amoco-acquires-arco/.

[60] Concerns centered around overlaps in Alaska North Slope crude production and ARCO's crude position in Oklahoma. To address this, BP was required to divest all of ARCO's Alaska North Slope oil production assets. BP also had to divest ARCO's Cushing crude oil business within four months to prevent harm to competition in crude oil and logistics markets. Federal Trade Commission, "FTC Clears Merger of BP Amoco and Atlantic Richfield Company" (April 13, 2000), https://www.ftc.gov/news-events/news/press-releases/2000/04/ftc-clears-merger-bp-amoco-atlantic-richfield-company.

below.[61] This decline is largely driven by California and federal fuel-efficiency standards, which forced auto manufacturers to produce more fuel-efficient vehicles.[62]

Figure 6. Historic and Forecasted Gasoline Demand in California (1950-2050)



Sources: *Historic Board of Equalization Taxable Gasoline Sales and Stillwater forecasts*

Second, total refining capacity in the state reached its all-time high during this period. Average annual state capacity between 1995 and 2005 was 1.71 million bpd, increasing to 1.80 million bpd between 2005 and 2015 (peaking at 1.91 million bpd in 2009), and then falling to 1.74 million bpd from 2015 to 2025. The 2005–2015 peak can be explained in part by intensive-margin improvements in existing refineries' efficiency and capacity rather than by extensive-margin new refinery entries.[63]

With more overall state refining output capabilities and less demand from consumers, big refiners consolidating the market in exchange for efficiencies was increasingly seen as a *solution* to high gas prices, not a problem.

The major difference between 2015 and 2005, as can be seen in Figure 5, is Tesoro's acquisition of two refineries: Shell's Wilmington refinery in 2007 and BP's Carson refinery in 2013.[64]

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[61] Stillwater Associates, *"Running on Empty: The Decline of Gasoline Demand in California,"* Stillwater Associates, accessed February 25, 2026, https://stillwaterassociates.com/running-on-empty-the-decline-of-gasoline-demand-in-california/.

[62] Federal and California vehicle-efficiency regulations became increasingly stringent during this period. Congress strengthened federal fuel-economy standards through the Energy Independence and Security Act of 2007, while California adopted the nation's first greenhouse-gas emissions standards for passenger vehicles, mandated by the legislature in 2002 and approved by CARB in 2004. National Highway Traffic Safety Administration, "Corporate Average Fuel Economy (CAFE) Standards," accessed June 3, 2026, https://www.nhtsa.gov/laws-regulations/corporate-average-fuel-economy#overview; California Air Resources Board, "History of the California Air Resources Board," accessed June 3, 2026, https://ww2.arb.ca.gov/about/history.

[63] Between 2005 and 2009, for example, Chevron increased capacity by about 20,000 bpd between its two refineries. See: U.S. Energy Information Administration, "Refinery Capacity Report," annual data on operable petroleum refinery capacity and related tables (as of January 1, 2025), accessed February 27, 2026, https://www.eia.gov/petroleum/refinerycapacity/.

[64] The other, less notable change during the period was Shell's sale of their Bakersfield refinery to Big West of California in 2006, due to Bakersfield no longer being strategic to Shell. The company retained ownership of pipelines and retail. Big West would only operate until 2009, selling to Alon in 2010. *Deseret News*, "Big West Oil to Buy Refinery in California," January 11, 2005, https://www.deseret.com/2005/1/11/19871121/big-west-oil-to-buy-refinery-in-california (accessed August 25, 2025).

Tesoro's First Acquisition - Shell Wilmington

In 2007, Tesoro, a company that already owned a 166,000 bpd refinery in Martinez, acquired Shell's Wilmington refinery, operating at 97,000 bpd.[65] The FTC granted early, unconditional termination of the acquisition's investigation, allowing the acquisition to proceed without a full-scale analysis. This streamlining of approval likely followed the precedent set in ***1994-2005: Era of Consolidation***, when the FTC treated Northern and Southern California as separate markets. Contemporaneous reception of this decision appeared to acknowledge this as the limit of Tesoro's expansion into the state's refining sector: a Reuters article on the acquisition stated that "with the completion of the purchase…Tesoro will likely be blocked by the U.S. Federal Trade Commission from acquiring further refineries."[66]

Tesoro's Second Acquisition - BP Carson

In 2013, however, following a nine-month investigation, the FTC approved Tesoro's acquisition of BP's Carson refinery, the second largest in California at 246,000 bpd.[67] Carson would be Tesoro's third refinery in California, and second in Southern California. The FTC's four primary arguments for allowing the acquisition were summarized in a letter from then-Attorney General Kamala Harris to then-CEC chair Robert Weisenmiller following the acquisition's approval: 1) decreasing demand for gasoline, 2) supplier count remaining unchanged, 3) increased economic and environmental efficiencies from integration, and 4) recent changes in market conditions and dynamics.[68] Unfortunately, it is not possible to trace the FTC's thinking from its approval of these two Tesoro acquisitions, given no such antecedent report existed for the Wilmington acquisition. We discuss each of these in detail below.

1. **Decreasing Demand for Gasoline:** retail gasoline demand had fallen and was projected to keep falling, creating excess capacity that would dampen Tesoro's ability to increase profits by raising prices. As a condition of the deal, Tesoro also agreed not to reduce CARBOB capacity for three years, to maintain historical average daily production at both Carson and Wilmington, and to actually *increase* CARBOB refining capacity by 400 bpd.[69] Monthly production-volume reporting for all West Coast refineries would enable the state to vigorously monitor compliance.

2. **Supplier Count Remains Unchanged:** Even after the acquisition, supplier count in the Western United States (PADD V) would remain at seven major refiners. Since Tesoro was already a player in the market and BP owned a 250,000 bpd refinery in Blaine, Washington,

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[65] *CSP Daily News*, "FTC OKs Tesoro Buy" (Mar. 30, 2007), https://www.cspdailynews.com/fuels/ftc-oks-tesoro-buy.
[66] Reuters, "Tesoro Seeks Growth after Refinery Buy -CEO," August 9, 2007, https://www.reuters.com/article/markets/oil/tesoro-seeks-growth-after-refinery-buy-ceo-idUSN19315048/.
[67] Federal Trade Commission, "FTC Closes Investigation into Tesoro's Acquisition of BP Refinery," press release, May 17, 2013, https://www.ftc.gov/news-events/news/press-releases/2013/05/ftc-closes-investigation-tesoros-acquisition-bp-refinery.
[68] Kamala D. Harris, Attorney General of California, letter to Robert B. Weisenmiller, Chair, California Energy Commission, May 17, 2013.
[69] Tesoro also agreed not to reduce CARBOB capacity for three years.

the number of West Coast refiners didn't decrease with the deal, so ostensibly rivals retained the ability and incentive to expand output if Tesoro tried to raise prices. It is important to note California's relatively isolated oil and gas market with respect to its neighbors: any actions by BP in Washington would have limited effects on Tesoro in California. This argument also contradicts the FTC's earlier reasoning that Northern and Southern California should be conceived of as two distinct markets. In fact, the FTC's decisions imply that not only is California a single market, but that all of PADD V was tightly linked together.

3. **Increased Economic and Environmental Efficiencies From Integration*:*** The deal would create economic and environmental efficiencies from integration. Tesoro committed to replace a highly-polluting Fluid Catalytic Cracker (FCC) with a single distillate desulfurization unit (DDU) for the combined complex and to file annual progress reports.

4. **Change in Market Conditions, With Respect to Past Cases**: Unlike the late-1990s and early-2000s, when the market was characterized by tight capacity and greater vertical integration, market dynamics were looser in 2013. Street prices were less directly set by refiners due to decreased vertical integration. That is, as gasoline was increasingly sold through independently operated stations rather than company-owned outlets, refiners exercised less direct control over the prices consumers paid at the pump. According to Attorney General Harris, "Tesoro, along with many other refiners, no longer sets street prices for gasoline." To maintain low prices, Tesoro also agreed to maintain ARCO as a value brand and to provide monthly Dealer Tank Wagon (DTW) price and production-volume data, along with their time-bound capacity commitments, giving regulators concrete tools to ensure supply isn't quietly reduced and that ARCO remains low-cost.[70]

Retrospectively, the Federal Trade Commission released a case study on Tesoro's acquisition of BP's Carson refinery in 2015 titled "Simulating a Homogeneous Product Merger: A Case Study on Model Fit and Performance."[71] The paper argued that the standard Cournot model, which assumes all firms exercise market power strategically, was poorly suited to California refining. Instead, the authors modeled the industry as a hybrid market. Under this approach, large refiners behaved strategically, while smaller firms were treated as price-taking competitors that expanded output in response to higher prices. Under this Cournot–fringe specification, the merger was not expected to produce significant increases in Los Angeles gasoline prices.

When assessing the merger, the FTC rejected a standard Cournot model because it implied marginal costs as low as $105 per barrel—below the average cost of crude oil in California in

[70] Retailers sign long-term contracts with refiners under Dealer Tank Wagon (DTW) arrangements, committing to buy all of their gasoline exclusively from the refiner and to sell only that refiner's branded product. Unlike in the rest of the United States, where DTW sales account for only about two percent of total fuel sales, in California the share has ranged from 35 to 46 percent over the past decade. California State Senate, *Review of the Gasoline in California and Related Issues: Joint Report of the California Energy Commission and California Department of Tax and Fee Administration*, January 2024, https://seuc.senate.ca.gov/sites/seuc.senate.ca.gov/files/cdtfa_cec_joint_report_2024_review_of_the_gasoline_in_california_and_relate.pdf (accessed August 25, 2025).

[71] Federal Trade Commission, *Simulating a Homogeneous Product Merger: A Case Study of Model Fit and Performance*, FTC Working Paper No. 327 (Washington, DC: Federal Trade Commission, 2017), https://www.ftc.gov/system/files/documents/reports/simulating-homogenous-product-merger-case-study-model-fit-performance/rwp_327.pdf.

2012. Since crude oil is the primary input in gasoline production, the FTC viewed these implied costs as implausibly low, suggesting that the standard model was misspecified. The hybrid specification produced more plausible implied costs and margins, with strategic firms earning only modest incremental margins and fringe firms operating close to zero incremental margin, thereby disciplining prices.[72]

The choice of model mattered because the two specifications generated very different predictions. The standard Cournot model predicted that the merger would reduce Tesoro and BP's combined output by 26 percent, lower industry output by two percent, and raise prices by six percent. The hybrid model predicted much smaller effects, estimating combined output decreases of seven percent, industry output by 0.3 percent, and prices rising by about one percent. With hindsight, the hybrid model appears closer to reality, as retrospective difference-in-differences and synthetic-control estimates found no statistically significant post-merger price effect.[73]

All in all, as demand began to shrink in the decade leading up to 2015, the exercise of market power became an issue decreasingly salient to California's refining industry in the eyes of the FTC. Yet this consolidation *may have* contributed to increased gas prices via another channel: an increased reliance on imports of finished gasoline.

2015-2025: Era of Net Importer

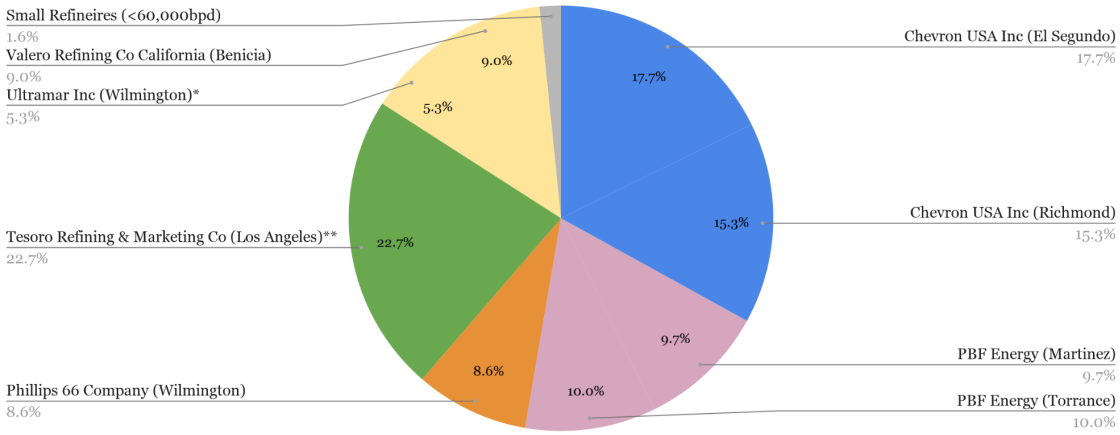
Over the last decade, California's transportation fuels market has been characterized by high gasoline prices relative to the rest of the U.S., partially explained by California's reliance on marine imports during tight supply conditions. From 2015 to 2025, total capacity fell from 1.87 to 1.61 million bpd, and planned closures entail an additional 315,000 bpd reduction by the end of 2026. Figure 7 shows that only five major players remain in the refining industry. While some lost capacity has been replaced by renewable fuels output, it remains only a fraction of the displaced conventional refining capacity.

[72] The hybrid model constrained all firms' marginal costs to fall between crude and the observed gasoline price. That simple adjustment produced plausible margins: Tesoro's implied marginal cost was about $116/barrel (≈9 percent margin) and BP's about $117/barrel (≈8 percent margin), while price-taking firms were estimated to operate close to zero incremental margin (marginal cost near price).

[73] In the same paper, Greenfield, Kreisle, and Williams find that, in retrospective tests, the difference-in-differences estimates are statistically indistinguishable from zero, and the synthetic-control estimate is not unusual relative to placebo cities.

Figure 7. Refinery Share of Capacity 2025

Operating Atmospheric Crude Oil Distillation, Barrels per Calendar Day



California's "Mystery Gas Surcharge"

One of the most frequently cited reasons for California's high gas prices is the state's regulations and environmental programs. California pays approximately 30 cents more per gallon than the U.S. average in taxes and fees.[74] This is largely driven by a high gas tax, (58 cents per gallon) environmental regulations like CAP & Trade (C&T) and the Low Carbon Fuel Standard (LCFS), and California's unique blendstock of gasoline, "CARBOB."[75]

Yet from 1996 to February 2015, the California gasoline price premium *tracked closely* with the taxation and production costs. Starting in 2015, however, California consumers began paying for gasoline at a rate 20-30 cents/gallon higher than the rest of the United States, *even when accounting for higher costs*. Severin Borenstein of U.C. Berkeley has coined the term "Mystery Gas Surcharge" (MGS) for the difference between gas prices in California and the rest of the United States that cannot be explained by differences in taxes and fees.[76] Figure 8 plots a reconstructed

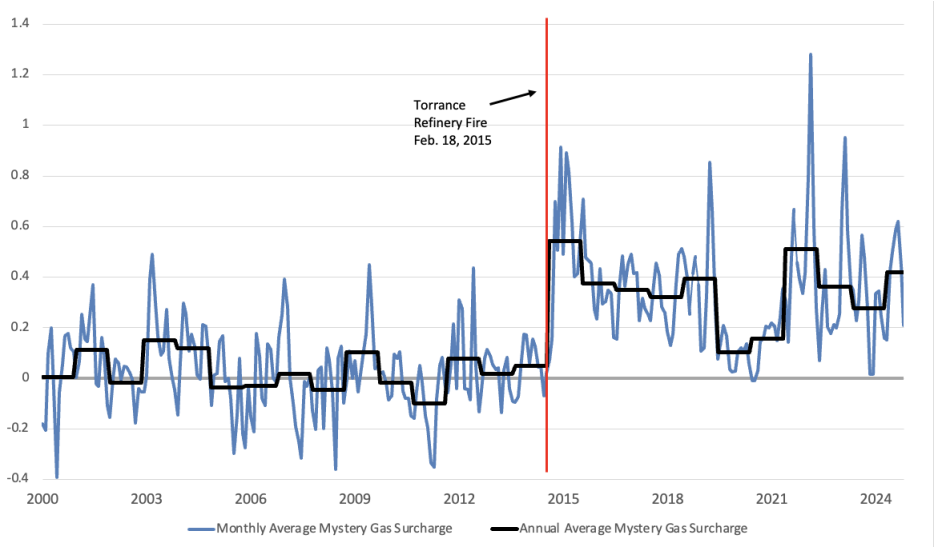
[74] American Petroleum Institute (API), "Gasoline Taxes: January 1, 2022." https://www.api.org/-/media/files/statistics/state-motor-fuel-notes-summary-january-2022.pdf.

[75] Oil Price Information Service (OPIS), *California's Gasoline Market: How the State's Unique Structure Impacts Pricing at the Pump* (Spotlight Analysis; OPIS, 2024), PDF, accessed February 23, 2026, https://info.opisnet.com/hubfs/OPIS-West%20Coast-Spotlight%20Analysis-1.pdf; California Energy Commission, "California's Petroleum Market," *Energy Almanac*, accessed February 23, 2026, https://www.energy.ca.gov/data-reports/energy-almanac/californias-petroleum-market.

[76] Severin Borenstein, "Trying to Unpack California's Mystery Gasoline Surcharge," *Energy Institute Blog* (UC Berkeley Haas), October 15, 2018, https://energyathaas.wordpress.com/2018/10/15/trying-to-unpack-californias-mystery-gasoline-surcharge/.

version of Borenstein's MGS over time.[77] The premium is absent before 2015, then appears abruptly at the same time as ExxonMobil's Torrance refinery fire, and persists thereafter.[78]

Figure 8. California's Mystery Gas Surcharge Before and After 2015 (unexplained price premium versus US in real 2025 dollars per gallon)



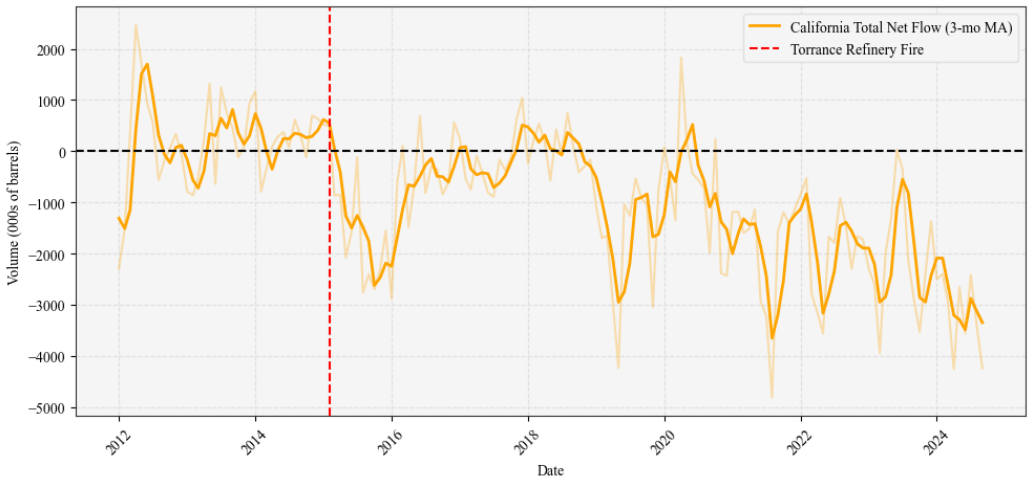
The emergence of the MGS after the Torrance fire coincides with California's shift toward net gasoline imports (Figure 9).[79]

[77] Note: Author's reconstruction and extension of Severin Borenstein's Mystery Gasoline Surcharge (MGS) series through 2025. The reconstruction follows the methodology and source structure described in the California Energy Commission, Division of Petroleum Market Oversight, 2024 Annual Report and Technical Appendix, which states that DPMO largely replicates Borenstein's formula for calculating the mystery gasoline surcharge and that its surcharge calculation is nearly identical to Professor Borenstein's original MGS calculation. The Technical Appendix also cites Severin Borenstein, "Mystery surcharge calculation 2019 May" [Excel spreadsheet] (May 2020). The author updated the underlying monthly inputs through 2025. Report: https://www.energy.ca.gov/sites/default/files/2025-10/CEC-900-2025-001.pdf. Spreadsheet cited in the appendix: https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Ffaculty.haas.berkeley.edu%2Fborenste%2FMysterySurchargeCalculation2019May.xlsx&wdOrigin=BROWSELINK.

[78] U.S. Chemical Safety and Hazard Investigation Board (CSB), "ExxonMobil Torrance Refinery Explosion," accessed February 23, 2026, https://www.csb.gov/exxonmobil-torrance-refinery-explosion-/.

[79] The state has historically been a net exporter of gasoline, even supplying neighboring states, but it lacks an inbound pipeline that could quickly bring in replacement supply during shocks. When supply tightens California typically must import crude for local refining and blend it to meet CARB specifications. See, in particular, Neale Mahoney and Ryan Cummings, "An Analysis of The Valero Benicia Refinery Closure on Gasoline Prices in California," *Neale's Substack*, June 20, 2025, https://nealemahoney.substack.com/p/an-analysis-of-the-valero-benicia.

Figure 9. California Total Net Gasoline Movement Over Time (Exports - Imports)[80]



Retail margins increased from roughly six percent of the retail gasoline price in 2013 to approximately 16 percent in 2023. Over the same period, gross refining margins increased from 38 to 77 cents per gallon in 2026 dollars.[81]

These elevated margins were not distributed evenly across retailers. Branded gasoline stations, despite selling a near-identical product, captured larger gains than unbranded stations. Between 2013 and 2023, average retail margins at Chevron, Shell, and 76 increased from approximately seven percent to 18 percent of retail price, compared with roughly six percent to 14 percent for unbranded stations.[82] By 2023, branded stations were capturing nearly one-fifth of the retail gasoline price as margin. Because California also has a relatively high share of branded stations, these premia likely magnified the effect of elevated margins.[83]

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[80] California total net gasoline movement is measured as monthly gasoline exports less gasoline imports using data from the California Energy Commission (CEC). Positive values denote periods in which California was a net exporter of gasoline, while negative values denote periods in which it was a net importer. The plotted series is a three-month moving average. The vertical dashed line indicates the February 2015 Torrance refinery fire.

[81] California Energy Commission and California Department of Tax and Fee Administration, *2024 Review of the Price of Gasoline in California and Related Impact on State Revenues* (Sacramento, CA: California Energy Commission, 2024), https://seuc.senate.ca.gov/sites/seuc.senate.ca.gov/files/cdtfa_cec_joint_report_2024_review_of_the_gasoline_in_california_and_relate.pdf. Nominal figures adjusted to 2026 dollars using the Consumer Price Index for All Urban Consumers (CPI-U). U.S. Bureau of Labor Statistics, 'Consumer Price Index for All Urban Consumers (CPI-U),' accessed June 2026, https://www.bls.gov/cpi/.

[82] California Energy Commission and California Department of Tax and Fee Administration, *2024 Review of the Price of Gasoline in California and Related Impact on State Revenues* (Sacramento, CA: California Energy Commission, 2024), https://seuc.senate.ca.gov/sites/seuc.senate.ca.gov/files/cdtfa_cec_joint_report_2024_review_of_the_gasoline_in_california_and_relate.pdf. Retail margin percentages for branded stations are the author's calculations based on the report's reported retail prices and retail margins for Chevron, Shell, and 76.

[83] Oil Price Information Service (OPIS), *California's Gasoline Market: How the State's Unique Structure Impacts Pricing at the Pump* (Spotlight Analysis; OPIS, 2024), PDF, accessed February 23, 2026, https://info.opisnet.com/hubfs/OPIS-West%20Coast-Spotlight%20Analysis-1.pdf.

A Shrinking Refining Industry

While refining profits have increased since 2015, four additional refineries have shut down or converted to renewable fuels facilities. Together, these closures/conversions have decreased state capacity by over 260,000 bpd. Two more refineries are expected to shut down by the end of 2026, further decreasing state capacity and tightening the market. In this section we briefly describe these closures/conversions.

1. **Conversions to Renewable Fuels Facilities:** Marathon idled their Martinez refinery in April 2020, citing the collapse in demand for refined products during the COVID-19 pandemic.[84] In early 2023, Marathon partnered with Nestle and converted the Martinez refinery into a renewable fuels facility, with capacity of about 47,700 bpd of renewable fuels.[85] Renewable diesel producers in California benefited from an "incentive stack" that allowed them to combine federal tax credits with Renewable Fuel Standard and California Low Carbon Fuel Standard credits. Between 2014 and 2024, these incentives averaged approximately $3.40 per gallon for renewable diesel sold in California (more than 50 percent above the average wholesale price of diesel fuel over the same period) making renewable fuel production substantially more attractive than it would have been on market terms alone.[86]

   Phillips 66's Rodeo refinery (115,000 bpd) was also converted into a renewable fuels facility, with commercial-scale production underway by April 2024 and full production rates of about 50,000 bpd reached by June 2024. Phillips 66 executive vice president of Refining Rich Harbison described the project as part of the company's long-term strategy to respond to increasing demand for renewable fuels production.[87]

2. **Refinery Closures:** Other refineries have stopped producing altogether. Most recently, Phillips 66 announced that it would cease operations at its 138,700 bpd Los Angeles-area refinery (the integrated Wilmington and Carson facilities) in the fourth quarter of 2025.[88] CEO Mark Lashier said the decision reflected the refinery's "long-term sustainability" being "uncertain and affected by market dynamics." Concurrently, Phillips 66 indicated that it would continue retail operations as the company's 76-branded stations remain major players in California's retail market.

   The most politically contested closure has been Valero's Benicia refinery. Valero ceased operating the refinery in April 2026 after first signaling in 2025 that it might idle, restructure,

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[84] Laura Sanicola, "Marathon Says It Will Idle 166,000 Barrel-per-Day Martinez, California Refinery," *Reuters*, April 17, 2020, https://www.reuters.com/article/markets/currencies/marathon-says-it-will-idle-166000-barrel-per-day-martinez-california-refinery-idUSKBN21Z2GI/.

[85] While this is still a substantial flow of fuel, it is less than one-third of the refinery's prior crude-processing capacity (over 160,000bpd at closure) before idling. Martinez Renewables, "Martinez Renewables," accessed February 24, 2026, https://www.marathonmartinezrenewables.com/.

[86] Jeremy Martin, "Biofuel Incentives in Flux: Interactions Between Federal and California Policy," Union of Concerned Scientists, February 3, 2026, https://blog.ucs.org/jeremy-martin/biofuel-incentives-in-flux-interactions-between-federal-and-california-policy/.

[87] Again, this renewable output is still well below the former Rodeo refinery crude-processing scale.

[88] Phillips 66, "Phillips 66 Provides Notice of Its Plan to Cease Operations at Los Angeles-Area Refinery," news release, October 16, 2024, https://investor.phillips66.com/financial-information/news-releases/news-release-details/2024/Phillips-66-provides-notice-of-its-plan-to-cease-operations-at-Los-Angeles-area-refinery/default.aspx.

or shut down the site.[89] The refinery had a 177,000 bpd capacity, accounting for nine percent of the state's total crude refining capacity. The company framed the decision as a response to California's difficult regulatory environment and high operating costs. Valero also recorded a $1.1 billion impairment on its California refining assets and announced that it was evaluating strategic alternatives for its remaining California operations.[90] In early 2026, however, Valero coordinated with state legislators to shift the plan for Benicia from a full market exit to a phased idling, with Valero continuing to produce gasoline through April, after which it will supply Northern California through inventories and imported gasoline.[91] Further, Valero has also been reviewing whether to continue operations at its Wilmington refinery, operating at 91,300 bpd capacity.

State legislators reportedly considered paying hundreds of millions of dollars to keep Valero's Benicia refinery operating, including proposals to cover major maintenance costs. Mahoney and Cummings, however, argue that the effect on gasoline prices would be limited (between negligible and 15 cents per gallon as a conservative upper bound).[92] They point out that California's marginal barrel is already imported, and argue that global refining capacity—together with in-state port, storage, and distribution capacity—would be sufficient to replace the lost output from Benicia's closure. They also caution that subsidizing Benicia creates a serious overpayment risk due to asymmetric information between the refiner and regulator and could set a precedent that encourages other refiners to threaten closure in order to extract subsidies from the state.

3. **PBF Enters the Market:** While historical players like Valero and Phillips 66 have gradually exited the California refining market, PBF has entered. In July 2016 PBF acquired ExxonMobil's Torrance refinery, operating at 160,000 bpd, and then Shell's Martinez refinery, operating at 156,000 bpd, in February 2020. The Martinez deal was delayed in late 2019 after the FTC issued a "second request" for additional information, a relatively rare step that typically indicates the FTC's interest in conducting a closer antitrust review. This move pushed the expected closing from the end of 2019 into the first quarter of 2020.[93] The sale was ultimately approved on January 28, 2020.[94] With these two acquisitions and the

[89] Sheila Dang, "Valero to Shut California Refinery in 2026 Amid Regulatory, Cost Pressures," Reuters, April 24, 2025, https://www.reuters.com/business/energy/valero-shut-california-refinery-due-tough-regulatory-environment-high-costs-2025-04-24/; U.S. Energy Information Administration, "Refinery Capacity Report: Table 3. Operable Atmospheric Crude Oil Distillation Capacity by Refinery," January 1, 2025, https://www.eia.gov/petroleum/refinerycapacity/table3.pdf.

[90] Sheila Dang, "Valero Books $1.1 Billion Impairment, May Idle California Refinery," Reuters, April 17, 2025, https://www.reuters.com/business/energy/valero-books-11-bln-impairment-may-idle-california-refinery-2025-04-17/

[91] Reuters, "Valero to Keep Importing Gasoline after Benicia Refinery Closure," *Reuters*, January 7, 2026, https://www.reuters.com/business/energy/valero-keep-importing-gasoline-after-benicia-refinery-closure-california-2026-01-07/.

[92] Prediction conditional on permitting that allows Benicia to convert to a product terminal. Neale Mahoney and Ryan Cummings, "An Analysis of The Valero Benicia Refinery Closure on Gasoline Prices in California," *Neale's Substack*, June 20, 2025, https://nealemahoney.substack.com/p/an-analysis-of-the-valero-benicia.

[93] Ted Goldberg, "Sale of Shell's Martinez Refinery Delayed Amid Antitrust Concerns," *KQED*, December 30, 2019 (updated July 15, 2024), https://www.kqed.org/news/11793275/sale-of-shells-martinez-refinery-delayed-amid-antitrust-concerns.

[94] Federal Trade Commission, "20191560: PBF Energy Inc.; Royal Dutch Shell plc," *Early Termination Notice* (Hart-Scott-Rodino), January 28, 2020, https://www.ftc.gov/legal-library/browse/early-termination-notices/20191560.

aforementioned refinery closures, PBF now controls almost 20 percent of California's total refining capacity.

While some corporations are deciding to take their refineries offline, many are maintaining their stake in the gas retail sector. Shell, Exxon, and Phillips 66 (owner of retail brand 76), each of whom have sold or taken offline refineries in the past decade, are all in the top 10 in share of gas stations in the state.[95] Valero, while having largely exited direct retail ownership after spinning off its convenience-store and gas-station business in 2013, continues to maintain a retail presence through branded stations operating under licensing and fuel-supply arrangements.[96]

CONCLUSION

The California refining industry has undergone a significant transformation in the last 45 years, with the market becoming increasingly consolidated.

Figure 10: Company Share of Capacity since 1995

Operating Atmospheric Crude Oil Distillation, Barrels per Calendar Day

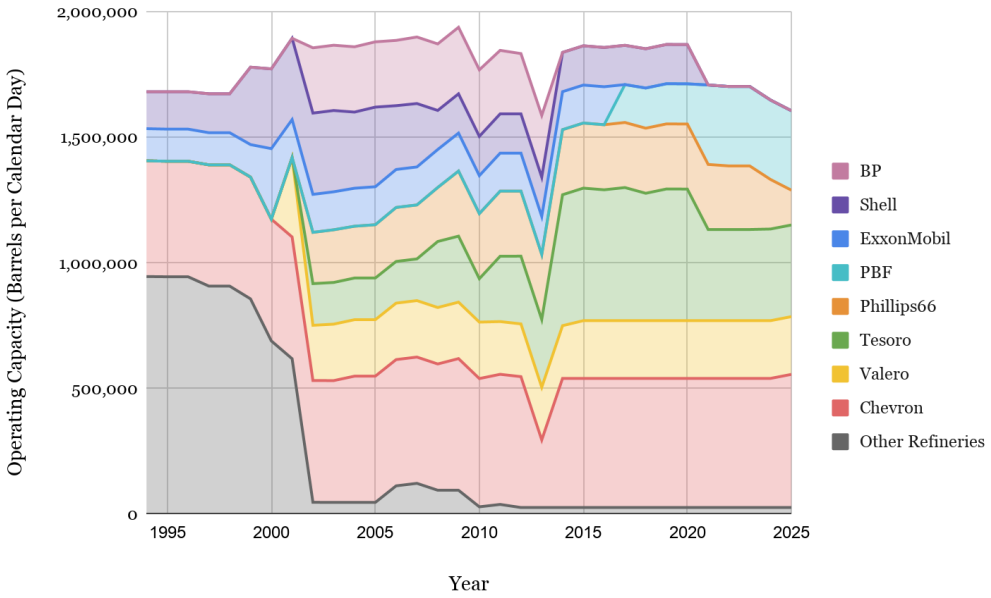

Figure 10 above details company share of capacity over the period of data available.[97] As can be seen, the trend of market consolidation has largely been driven by the exits of small or independent refineries.

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[95] ScrapeHero, "10 Largest Gas Stations in California in 2026 Based on Locations," last updated January 27, 2026, https://www.scrapehero.com/location-reports/top-gas-stations-in-california-usa/.

[96] Reuters reported that in 2012 Valero sought to separate its retail business, which consisted of nearly 1,000 U.S. stores and approximately 775 stores in Canada. The company completed the spin-off in 2013 through the creation of CST Brands. Soyoung Kim, Olivia Oran, and Greg Roumeliotis, "Valero May Raise over $3.5 Billion in Retail Sale -Sources," Reuters, September 27, 2012, https://www.reuters.com/article/business/valero-may-raise-over-35-bln-in-retail-sale-sources-idUSL1E8KRH89/; "Valero Board Approves Spinoff of Retail Business," Reuters, April 4, 2013.

[97] Since data for 1996 and 1998 are not available, we assumed that share of capacity stayed constant during those years; In 1994, "other refineries" include ARCO, Equilon, Mobil (before merging with Exxon), Tosco, Texaco, Unocal, Ultramar, and 276,000 bpd in small refineries (Huntway, Kern, Lunday Thagard, Paramount, Tosco Arroyo

In the 1980s, the industry was relatively pluralistic, with a total of 37 gasoline-producing refiners active in the market. Geopolitical shocks, stringent anti-pollution and reformulated gasoline requirements, and potential exercises of market power led 17 refineries, mostly smaller, highly polluting, and inefficient, to cease operations between 1980 and 1994.

Between 1997 and 2002, five mergers—all big oil majors selling to other oil majors—were permitted by the FTC, most conditional on certain divestitures, consolidating the industry such that seven refiners controlled almost 95 percent of statewide capacity by 2005.

Between 2005 and 2015, market trends shifted in California as a decreasing demand for gasoline and increasingly efficient refineries led to excess capacity, which meant large refineries were subject to a certain level of price discipline. This caused the FTC to treat Tesoro's acquisition of BP's Carson refinery with more latitude than past acquisitions, despite the company already owning two refineries in the state.

In the past decade, California has become a net importer of gasoline and, concurrently, gas prices have risen by about 43 cents per gallon, a persistent premium referred to as the "Mystery Gasoline Surcharge" by economists and regulators.[98] In tandem, many refineries have either shut down or converted to renewable fuels facilities. While companies cite high operating costs and a lack of future profitability in the refining industry, they have maintained their presence in the retail sector.

By 2025, only Chevron, Valero, Tesoro, Phillips 66, and PBF remain as major players in California refining. As Phillips 66 plans to take its Wilmington refinery offline, the number of market participants is set to fall to just four—down from 31 in 1980, capping off a four-decade transformation of the refining industry in California.

Grande, Powerine, Sunland, Tenby). Since 2011, The only "other refineries" that have been producing are Kern, Bakersfield at 26,000 bpd and Lunday Thagard, South Gate, at 8,100 bpd.

[98] Calculated taking the average of the reconstructed MGS series underlying Figure 8 over the period March 2015 through July 2025.